Implementing Federal Building Energy-Efficiency Standards

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ISWG
April 15, 2008

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Overview

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1) New Federal Requirements (EPAct 2005, MOU, DOE rule, EISA)
2) Exemplary Buildings Recently Completed
3) Awareness & Implementation at Agencies
4) Emerging Technologies
5) Recommendations
    1) Awareness-building
    2) Guidance
    3) Role of Emerging Technologies
    4) Policy

Project Purpose

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- ASE tasked to support FEMP in helping federal agencies respond to EPAct 2005
  - Sustainable federal buildings
    - Gauge levels of awareness and implementation of new federal building stds.
    - Highlight case studies showcasing best practices
  - Federal opportunities for adopting emerging technologies
    - Roles emerging technologies can play in federal buildings

Sources of New Federal Requirements – part 1

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- EPAct 2005
  - Design for energy consumption 30% below -
    - ASHRAE 90.1-2004 (commercial & high-rise res)
    - 2004 IECC (low-rise residential)
  - “if life-cycle cost-effective”
  - Apply sustainable design principles to siting, design, and construction
  - Does not include renovations

Sources of New Federal Requirements – part 2

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- MOU – Federal Leadership in High Performance and Sustainable Buildings
  - Signed in 2006
  - Established "guiding principles"
    - New construction - "target" reducing the *energy cost budget* by 30% compared to ASHRAE 90.1-2004
    - Major renovations – "target" reducing the *energy cost budget* by 20% below pre-renovation 2003 baseline
    - Both new and renovations – design to earn Energy Star label

Sources of New Federal Requirements – part 3

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- DOE Interim Final Rule
  - Effective Jan 3, 2007
- DOE Final Rule
  - Issued Dec 21, 2007
  - Effective Jan 22, 2008
  - Includes 30% below ASHRAE & IECC req.
  - New construction, including leased, *and*
  - Says EO 13423 includes mandatory requirements for major renovation
  - Excludes plug load & process loads from base and from % savings (unlike ASHRAE 90.1 App. G)

Sources of New Federal Requirements – part 4

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- Energy Independence and Security Act (EISA) of 2007
  - Signed by Pres. Bush on Dec. 19, 2007
  - FY 2010
    - For new construction and major renovations
    - "energy intensity" (energy/ft^2)
    - Design to reduce fossil fuel use by 55%
    - % increases every 5 years. 100% reduction by 2030
    - Baseline is 2003 similar building, per CBECS or RECS
  - By 12/19/2010, must lease only buildings with Energy Star label
  - Much still to be resolved with the language on building performance

Recently Completed Buildings Lead the Way – part 1

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- Designs preceded EPAct 2005
- Includes office buildings, courthouses, visitor centers, others
- Typically include energy-efficient lighting, daylighting, e-e HVAC, green features
- Many pursuing LEED
  - GSA lists 22 recently completed LEED projects
- LABS21
  - Best practices
  - Case studies

Recently Completed Buildings Lead the Way – part 2

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- How do these recently completed buildings fare against the new requirements?
  - Hard to tell (baselines changing over time), but 30% above “a baseline” is proving achievable
  - Most compare design to something other than ASHRAE 90.1-2004
  - Many designed with LEED in mind, with energy-efficiency just one tool in the shed
- How are they performing?
  - None involve long-term monitoring and verification

Findings & Issues, part 1

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- Interviews included personnel at agency, regional, and facility level
- All aware of EPAct 2005 and requirement to design for 30% below ASHRAE
- Some incorporated into FY 07 designs
- When does the clock start? (Some waiting until FY 09)
- Mixed views on cost impacts of 30% requirement
  - “will require additional design funding”
  - “just need to design smarter”
  - “costs to comply will compromise other design elements”

Findings & Issues, part 2

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- Some confusion – 2004 ASHRAE or “current” ASHRAE
- Some confusion on whether to include plug loads
- Some concerns about energy-intensive buildings being able to comply
  - Hospitals
  - Labs
- “Energy consumption” vs. “energy cost method”
- Exempting “minor” (under $10M) projects?
- Do earlier designs need to be revisited?
- Should we begin to address EISA requirements?

Preliminary Recommendations – part 1

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- Educational
  - Forum needed
    - FEMP & GSA's new green buildings office – logical hosts
  - Training for federal personnel
  - Consider ASHRAE's High-Performance Building Design Professional Certification?
- Need "plain language" guidance
  - Post prominently on FEMP web page, and agency pages
  - Clearly state baselines, effective dates
  - Link resources, such as Whole Building Design Guide

Preliminary Recommendations – part 2

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- Incorporate into guide specs
  - Uniform Facilities Criteria
  - Federal Green Construction Guide for Specifiers
- Develop federal design guide packages for building types not covered by ASHRAE series (prisons, medical centers, postal distribution centers)
- Need to track building energy performance
  - Adopt M&V protocols
  - Track predicted (design) vs. measured
  - Whole building metering
  - Submetering when appropriate

Preliminary Recommendations – part 3

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- Promote adoption of emerging technologies
- Establish long-term demonstration program
  - FEMP & DOE Building Technologies Program
  - With EISA in mind (zero-energy by 2030)
  - Highlight leading edge strategies
  - Engage A&Es, suppliers, other stakeholders
  - Seek leverage with utilities, others

THANK YOU!

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Why New and Emerging Technologies

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- Increase federal savings
- Federal market leadership
- Help technologies cross through the "Valley of Neglect"

Implementation Mechanisms

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- ESPCs, UESCs
- Equipment and building leases
- Technology procurement
- Utility incentives & design assistance
- Demonstrations
  - Appropriated funds
  - Donated equipment

DOE and DoD: New Technology Initiatives

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- DOE/FEMP New Technologies Demonstration Program (NTDP, www1.eere.energy.gov/femp/new_technology/)
  - Tech Alerts, Tech Focus, Installation Reviews
- Navy Technology Evaluation Program (TechVal)

  – Naval Facilities Engineering Service Center, Pt. Hueneme, CA
- DOE-DoD TechVal Working Group (4/08+)
  - DoD lead: Cdr. Brad Hancock (Jeff Marqusee)
  - DOE Lead: Allan Hoffman

Simplified TechVal Organizational Diagram

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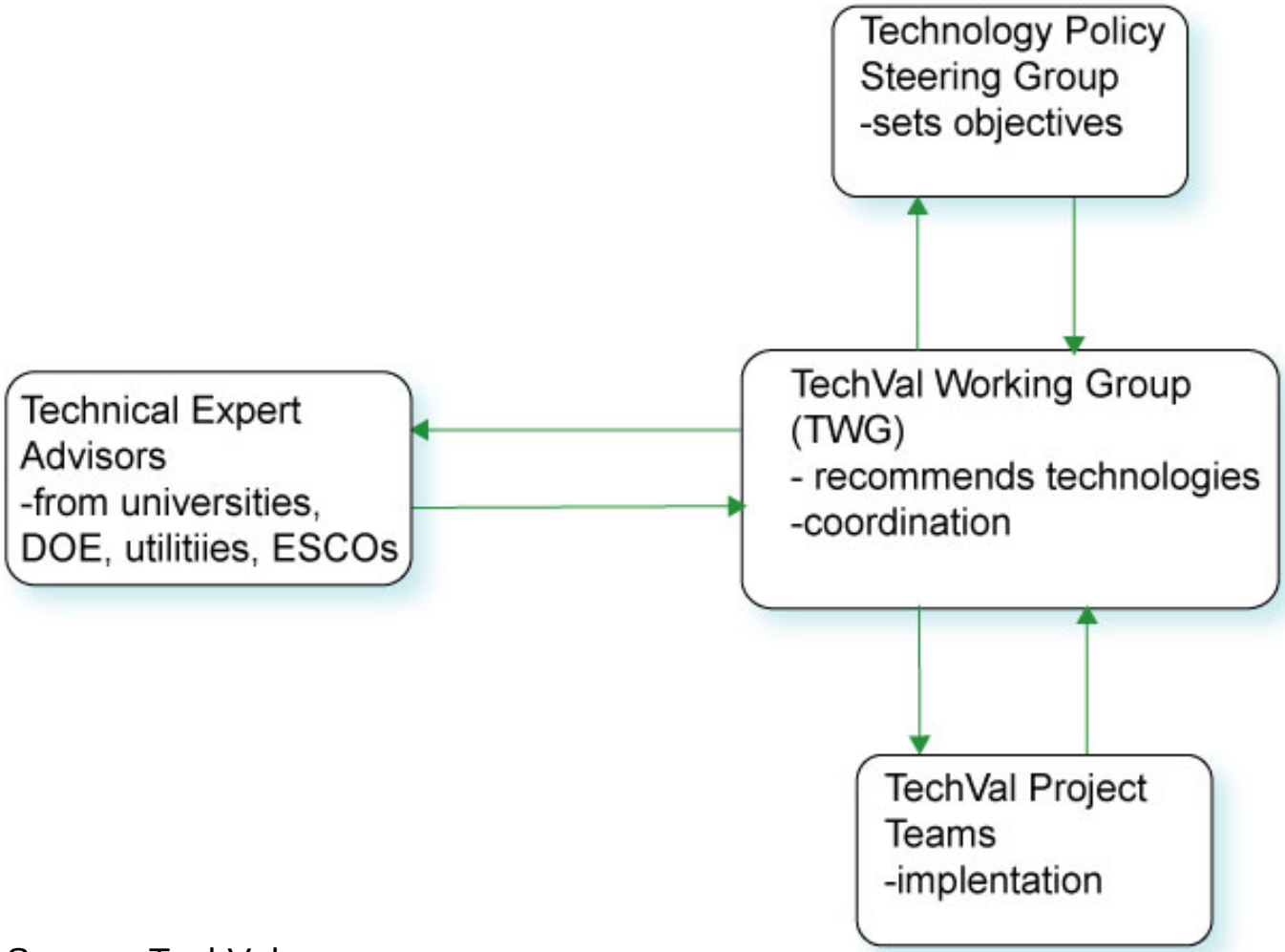

Source: TechVal

Diagram for Suggested Interagency Coordination

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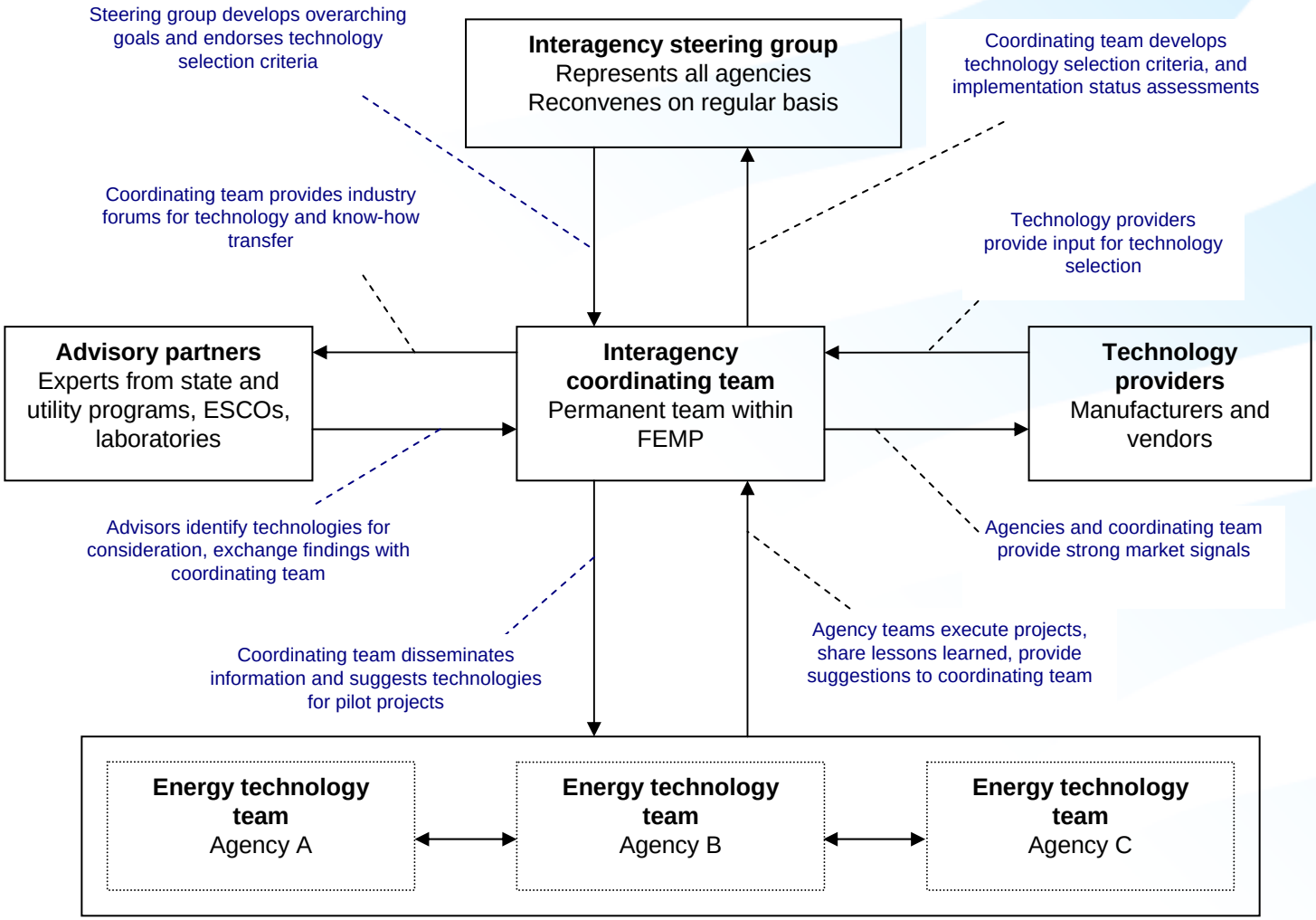

Our Recommendations

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- Establish agency-level teams to lead technology validation and implementation;
- Establish an interagency coordinating team to provide consistency to federal efforts;
- Disseminate project results within the federal sector;
- Leverage funding and financing mechanisms; and
- Involve non-federal stakeholders in implementation strategies and send strong market signals.

For More Information

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